

cause, but concluded that the benefits presented by IBOC operation would outweigh the increased interference. Insofar as AM operation is concerned, this is not the case. The promise of “near FM” quality in a limited service area is not worth the increased interference on the band. AM stations already have the potential to deliver “near FM” quality to listeners with all but the poorest quality receivers.

Further, the argument that the AM digital signal is more robust than the analog signal is a fallacy. Loss of one sideband can cause the digital receiver to revert to analog (and 5 kHz analog at that) while loss of a portion of the analog signal can usually be compensated for by the receiver’s AGC circuit. Analog AM can deliver a high quality stereo signal. Can an IBOC system operating under the proposed NRSC 5- standard do the same at an acceptable bit rate?

The promises of “enhanced performance” under the proposed standard simply do not justify the increased interference that would burden the band.

**AM Operation Under the Proposed Standard Violates Existing Allocation Standards.**

Reunion acquires AM broadcast properties and seeks to enhance those properties by maximizing the signal, within the Commissions existing rules, so that service to the public is enhanced. We are not alone in this endeavor. The last AM major change window demonstrated a huge number of new applications. The AM band is not dead.

Anyone familiar with the AM allocation rules knows that one of the most significant limiting factors in the expansion of a station’s service area arises as a result of adjacent channel stations. Allocation rules have changed over time, and as a result, there are areas of significant “grandfathered” contour overlap. Digital operation by one or more of the overlapping stations

effectively increases the amount of the signal overlap in direct contravention of the Commission's rules.<sup>1</sup>

The few existing AM IBOC stations in the United States have demonstrated the level of interference which results from using the existing *analog* NRSC mask in an attempt to legitimize hybrid analog/digital operation. As noted in prior comments in this proceeding, the NRSC mask was intended to deal with splatter resulting from analog broadcasting. At the time those rules were adopted, it was never contemplated that the mask would be filled with "always on" ODFM carriers. **Any attempt to utilize the proposed NRSC-5 standard to codify the introduction of another emission type into the existing AM analog mask is an improper attempt to extend the provisions of Section 73.44 beyond its intended scope and purpose.**<sup>2</sup>

Recently, a contributing engineer/columnist for Radio World suggested that it was time to "Thin the Herd" to make way for digital broadcasting. Acknowledging the increased level of interference that would result from IBOC operation, the author suggested that AM stations be given an incentive to "go dark" in order to make way so that "the stronger members can improve and become better prepared for survival"<sup>3</sup>

Just how can any of this serve the public interest, convenience and necessity? How can the reduction of existing service areas or the elimination of voices available to the public be construed to be in the public interest?

Reunion respectfully requests that the Commission undertake testing to measure and quantify interference to AM stations that can result from operation pursuant to the proposed standard. Justifying the standard as fitting within the analog mask is not enough. Subjective listening tests are not enough.

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<sup>1</sup> Section 73.37

<sup>2</sup> Section 73.44 specifically deals with "AM transmission system emission limitations."

Measure the difference between the adjacent channel energy within the NRSC mask presented by a typical analog station and that introduced by the ODFM carriers of a station operating in the hybrid mode. Then, increase the power of the station operating in the analog mode to a level where the analog adjacent channel energy equals the adjacent channel energy presented by a station operating in the hybrid mode. Map the predicted contours at that power level. Does it fit within the existing allocation rules? No.

This leads to one obvious conclusion: **Stations operating in the hybrid mode described in the proposed standard should be required to reduce power to the point where the energy introduced into adjacent channels does not exceed that introduced by analog operation.**

Unless conversion is mandated by the Commission, analog operation on the AM band will be here for years to come. The existing IBOC system simply provides insufficient benefits to induce many broadcasters to convert their operation from analog to digital. Some broadcasters, while desiring to convert to IBOC operation under the proposed standard will be unable to do so simply because of the substantial plant improvements required to transmit an acceptable signal. In short, analog stations will continue to serve a large portion of the United States listening public for the foreseeable future. Existing and future analog stations should be protected from increased interference. Failure to do so is a failure to protect the public interest.

### **Conclusion and Request for Relief**

For the reasons stated above, Reunion respectfully requests that the Commission not adopt the proposed “NRSC-5” standard to the extent that it applies to AM operation. The proposed standard is silent as to interference which would occur from proposed operations. Rather, Reunion requests that the Commission entertain a proposed standard which contains a

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<sup>3</sup> Radio World Online, Guy Wire “Let’s Save the AM Band”, May 24, 2005.

mechanism for stations seeking to operate utilizing the iBiquity IBOC mode to reduce power to the extent that the adjacent channel energy introduced is equivalent to that introduced by analog operation.

Respectfully requested,

D. Stanley Tacker, Esq.

July 18, 2005

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

\_\_\_\_\_  
In the Matter of: )  
)  
)

Digital Audio Broadcasting Systems And )  
Their Impact on the Terrestrial Radio )  
Broadcast Service )  
\_\_\_\_\_)

MM Docket No. 99-325

**COMMENTS OF BROADCAST SIGNAL LAB, LLP ON  
NATIONAL RADIO SYSTEMS COMMITTEE'S  
"IN-BAND/ON-CHANNEL DIGITAL RADIO BROADCASTING STANDARD NRSC-5"**

Broadcast Signal Lab, LLP submits these comments, in response to the *Public Notice* of June 16, 2005, to contribute to the dialogue on the evaluation of spectral occupancy of IBOC signals and the interference potential of out of band emissions. The proposed National Radio Systems Committee (the "Committee" or "NRSC") *In Band/On-Channel Digital Radio Broadcasting Standard NRSC-5* ("NRSC-5") contains RF masks for AM and FM IBOC emissions.<sup>1</sup> While the intentional IBOC emissions in the hybrid mode were an integral part of the interference analysis performed under the oversight of NRSC<sup>2</sup>, no specific assessment of out

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<sup>1</sup> NRSC-5, Sections 4.1.7 and 4.2.7, and normative reference documents [8] and [6], respectively.

<sup>2</sup> NRSC DAB Subcommittee, *Evaluation of the Ibiqity Digital Corporation IBOC System, Part 1 FM IBOC*, and *Part 2 AM IBOC*, each containing §4.11 Criterion 9, Host Analog Signal Impact, and §4.12 Criterion 10, Non-host Analog Signal Impact, and,

of band emissions was made by the Committee. In fact, the Committee suggests that additional filtering may be needed in some circumstances.<sup>3</sup> Fortunately, the general experience with IBOC installations to date has been largely successful from an interference standpoint. Nevertheless, the potential exists for NRSC-5 compliant out of band emissions to cause interference.

Broadcast Signal Lab proposes that the emissions masks in NRSC-5 remain the primary reference for evaluating spectral occupancy, and that FCC regulations include a “relief valve” for extenuating circumstances where NRSC-5 compliant emissions cause excessive interference. We also propose that the methods of evaluating IBOC spectral occupancy be more thoroughly evaluated and described to insure consistency among the results obtained by broadcasters, consultants, equipment manufacturers, and regulatory enforcement.

## **I. INTERFERENCE POTENTIAL OF IBOC OUT-OF-BAND EMISSIONS**

IBOC signals are digital waveforms that employ a modulation technique called orthogonal frequency division multiplexing (“OFDM”). In hybrid IBOC operation, the current mode of IBOC transmission, these OFDM signals are transmitted in frequency blocks above and below the host analog signal. When they are combined, these signals still behave as three closely-spaced independent signals side by side; lower side band (“LSB”) OFDM, analog carrier, and upper side band OFDM (“USB”).

When three signals are combined they have the potential to *intermodulate*, a condition in which the signals mix and produce unintended emissions, often on other

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<sup>3</sup> NRSC-5 footnotes 3 and 4, “The requirements for noise and spurious emission limits illustrated in Figures 9-11 [and 19 & 20] reflect acceptable performance criteria. In certain circumstances additional measures (filtering, active emissions suppression, etc.) may be needed to reduce the (continued...) ”

frequencies. The intermodulation products that appear off the assigned frequencies of the signals are often called *spectral regrowth*, due to the manner in which they appear on a spectrum analyzer as signals are added or power levels are increased.

Broadcast Signal Lab has made several technical presentations on the characteristics of FM IBOC intermodulation.<sup>4</sup> Broadcast Signal Lab has determined that in certain circumstances a hybrid IBOC station operating with NRSC-5 compliant out of band emissions may cause interference to reception of 2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup>-adjacent channel stations.<sup>5</sup> The presence of such interference occurs with the right combination of strong spectral regrowth on a particular frequency and the particular signal strength of an affected adjacent channel station.

In a real case in the Boston, Massachusetts area, the interference not only occurred within the official blanketing area of the new hybrid IBOC station, but also in an area substantially greater.<sup>6</sup> While, to the best of our knowledge, there were no listener complaints about this particular interference to two 4<sup>th</sup>-adjacent channel stations, good engineering practice would anticipate and prevent such interference in order to maintain a “clean” FM reception environment for all.

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spectral emissions below the limits given in this subsection in order to reduce mutual interference between broadcast stations.”

<sup>4</sup> Maxson, David, 2004 NAB Broadcast Engineering Conference Proceedings, *Interference Potential of Hybrid Digital Transmission: An IBOC Occupied Bandwidth Case Study*, p. 197, as well as presentations at IEEE Broadcast Technology Society 2004, NAB Radio Show, 2004, and 2005 NAB Broadcast Engineering Conference

<sup>5</sup> With hybrid OFDM signals approximately  $\pm 164$  kHz on center from the analog carrier frequency, out of band emissions may occur at 164 or 328-kHz intervals up and down the band. Key frequencies are at  $\pm 492$  kHz, directly between 2<sup>nd</sup> and 3<sup>rd</sup>-adjacent channels, and at  $\pm 820$  kHz, directly on 4<sup>th</sup>-adjacent channels.

<sup>6</sup> Maxson, David, 2004, NAB Broadcast Engineering Conference, *Occupied Bandwidth Case Study*, slide presentation, slide #22.

The interference was relieved by the addition of a bandpass filter on the transmission line. Newer models of transmitter that employ dynamic spectral regrowth reduction techniques are available. These transmitters produce very little spectral regrowth energy and are compliant with the NRSC-5 RF mask by a very large margin. However, broadcasters have a variety of transmitter products and characteristics to consider when purchasing, so transmitters with dynamic pre-correction may not be the norm in the marketplace for some time to come.

Digital spectral regrowth may be more damaging than the IBOC RF mask would indicate.<sup>7</sup> Broadcasters should evaluate the potential for spectral regrowth to cause interference to adjacent channel stations serving the area, and if necessary, provide additional filtering .

One method of analysis would be to evaluate an FM station's new hybrid IBOC emissions in the context of all 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> adjacent channel stations.

A suggested method of analyzing interference potential of spectral regrowth:

If a new hybrid IBOC station is located within the protected contour of any of these adjacencies, the adjacent channel station contour that intersects the new hybrid IBOC transmission site would be the spectral regrowth protection contour ("SRPC") of that adjacent channel station. The total spectral regrowth power (TSRP<sub>200</sub>) in the 200 kHz bandwidth of an affected adjacent channel station would be

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<sup>7</sup> Consequently, when a hybrid IBOC FM transmitter generates spectral regrowth at, say, 820 kHz offset from center frequency, that energy is spread over a substantial bandwidth of potentially 100 kHz or more. The FM RF mask, however, measures spectral regrowth as power spectral density in a 1-kHz bandwidth. An NRSC-5 compliant spectral regrowth spurious emission at -80 dBc/kHz with respect to the host analog carrier would have a total power that is about 20 dB greater than the 1 kHz power, or -60 dBc, because it may be about 100 kHz wide. Placing a hybrid FM undesired station on the 60 dBu contour of a fourth adjacent channel desired station, we can see that at the undesired 100 dBu contour the total spectral regrowth power on 4<sup>th</sup> adjacent could be 100dBu – 60 dBc = 40 dBu. With a desired signal at 60 dBu, the 40dBu spectral regrowth on the same channel is likely to cause interference.



measured or computed from the measured 1 kHz power spectral density. It would be reported in dBc with respect to the new hybrid host analog signal. The blanketing interference contour of the new hybrid station, 115 dBu, would be employed as the reference level for spectral regrowth analysis. At the blanketing contour, 115 dBu, the  $\text{TSRP}_{200}$  of the new hybrid IBOC station must be 30 dB below the existing SRPC contour level. The following requirement must be met for each 2<sup>nd</sup>, 3<sup>rd</sup>, & 4<sup>th</sup> adjacent station within whose protected contour the new FM hybrid IBOC station is located, or additional spectral regrowth mitigation must be implemented to make it so:

$$115 \text{ dBu} + \text{TSRP}_{200}(\text{dBc})^8 + 20\text{dB}^9 \leq \text{SRPC}$$

For example, a new FM hybrid station with a -80 dBc/kHz NRSC-5 compliant emission might have a -60 dBc  $\text{TSRP}_{200}$  on the fourth adjacent channel. Say it is located on the 65 dBu contour of that 4<sup>th</sup> adjacent channel station. The spectral regrowth interference test would compute:  $115 - 60 + 20 = 75$  dBu, which is a value greater than the 65 dBu contour of the protected station and would cause interference. At least 10 dB of additional spectral regrowth attenuation would be necessary to protect the 4<sup>th</sup> adjacent station.

Broadcast Signal Lab has not yet performed analysis of spectral regrowth issues of AM hybrid IBOC stations. AM IBOC transmitters tend to operate with different amplification

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<sup>8</sup> TSRP is a negative number

<sup>9</sup> 20 dB is proposed as a cochannel protection ratio based on the traditional co-channel ratio. Another value for this figure could be derived experimentally.

classes and filtering schemes than FM transmitters and may have less of a tendency to radiate spectral regrowth, or at least present different mechanisms for generating spectral regrowth. AM spectral regrowth as a potential source of interference should not be overlooked. At the least, a relief mechanism similar to the FM mechanism proposed should be considered.

## **II. CONSISTENT MEASUREMENT TECHNIQUES**

Broadcast Signal Lab has also performed some work on IBOC RF signal measurement issues. The spectrum analyzer is becoming more familiar to many broadcast engineers. However, there are many pitfalls in making measurements with spectrum analyzers.<sup>10</sup> Power measurement features vary among analyzers. Most reliable are channel power measurement functions, followed by sample detection and averaging. Least useful are peak hold, peak averaging and narrow video bandwidths. There are inherent variations among analyzers in their accuracies and uncertainties.

We suggest that the Commission's Office of Engineering and Technology articulate or adopt one or more reference measurement techniques and equipment constraints to enable broadcast engineers, manufacturers, and consultants to generate reproducible results that would satisfy regulatory occupied bandwidth compliance analysis.

## **CONCLUSION**

Broadcast Signal Lab is encouraged by the progress of IBOC standardization. In this memorandum two key points are addressed: 1) Interference management of spectral

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<sup>10</sup> Maxson, David, 2004 IEEE Broadcast Technology Society presentation, *Considering Measurement Requirements for IBOC Radio*

regrowth is not necessarily satisfied by adoption of the NRSC-5 RF masks, unless a relief mechanism is provided for special circumstances where NRSC-5 compliant spectral regrowth has interference potential; 2) Measurement of the mask-compliance of NRSC-5 emissions is subject to a broad range of errors and uncertainties that raise the possibility of substantial variation among different measurements of the same signal. If the Commission intends to enforce spectral emissions limits, a reference method or methods of verifying compliance should be articulated.

Respectfully submitted,

**Broadcast Signal Lab, LLP**



By: \_\_\_\_\_

David P. Maxson  
Managing Partner  
Broadcast Signal Lab, LLP  
503 Main Street.  
Medfield, MA 02052  
508 359 8833

July 18, 2005

Before The  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554

In the Matter of	)	
	)	
National Radio Systems Committee	)	
"In-Band/On-Channel Digital Radio	)	
Broadcasting Standard NRSC-5"	)	
	)	
Digital Audio Broadcasting Systems	)	MM Docket No. 99-325
and Their Impact in the Terrestrial	)	
Radio Broadcast Service	)	

**Comments of**  
**Cohen, Dippell and Everist, P.C.**

The following comments on the National Radio Systems Committee's "In-Band/On- Channel Digital Radio System Broadcasting Standard" are respectfully submitted by the consulting engineering firm of Cohen, Dippell and Everist, P.C. ("CDE") with reference to the June 16, 2005 Public Notice concerning MM Docket No.99-325. CDE or its predecessors have been providing consulting engineering services to the broadcast industry for over 60 years.

It is obvious that much work and thought have been given to developing the NRSC-5 standard. However, there are contentious issues that remain for the Commission. Some of these issues are to resolve critical hours, nighttime, international treaties, and other related items for AM broadcast stations and the FM emissions which are outside the current emission criteria for FM stations. These comments focus on the primary perceived complications to implement the NRSC-5 standard within the AM broadcast band and for FM, the out-of-band as it affects NTSC, DTV and the aeronautical band.

Basically, the following comments were furnished by this firm in its Comments--*Further Notice of Proposed Rulemaking and Notice of Inquiry in MM Docket No. 99-325*, dated June 16, 2004.

Substantially, these are as relevant today as previously submitted.

### AM

The Commission adopted Rules in MM Docket No. 87-267 to provide a guideline to revitalize the AM service by developing two models and revisited the technical analysis procedures.

Model I and Model II facilities are defined in Section 73.14 of the FCC Rules. The docket modified the technical analysis by an increase in the first and second-adjacent channel protection ratios to reduce adjacent-channel interference; changed the nighttime calculation method of coverage and interference and imposed a reduction of 10% for modification of AM facilities.

The stated purpose by the Commission in adopting those Rules was to halt the decline in existing service. In fact, for nighttime MM Docket No. 87-267 developed an approach by reducing or restricting nighttime interference by considering all skywave signals to include not only co-channel, but also first-adjacent channels and also replacing the 50% RSS exclusion method by considering 25% RSS exclusion interference levels.

Further, the Commission in that Docket sought to address flexibility, coverage, and noise. The docket also incorporated a single classification system to conform to the International Agreements which the United States is signatory. These International Agreements are noted in Sections 73.23 and

73.1650 of the FCC Rules.

In MM Docket No. 99-325, the Commission is encouraged to revisit its actions of September 26, 1991, to ascertain if the three-part strategy adopted revived the AM broadcast radio service and halted or reversed the decline in competitive AM service as it envisioned. Further, the Commission is encouraged to review where appropriate the two models of AM station operation to ascertain if those parameters are achieving the desired result after their implementation over 12 years ago and whether those procedures should be revised if the IBOC system is adopted. The purpose would be to establish the apparent interference to certain Class A and Class B stations that possibly would occur by the implementation of IBOC and determine if the adoption of IBOC would be consistent with Model 1 and Model 2.

Currently, it is understood that a part of the EAS system uses a Primary Entry Point ("PEP"). Many of these PEP locations are the so-called old Clear Channel stations. These so-called Clear Channel stations provide protected wide-area daytime and nighttime service. The impact of IBOC on this PEP system needs to be calculated or determined so that this important function is not unduly impacted.

**FM**

The Commission has over the years adopted rules or Notice of Proposed Rulemaking such as

Docket 20735<sup>1</sup> and Docket No. 85-108<sup>2</sup> in which the introduction of additional energy in the FM band could have technical consequences if IBOC is placed into permanent service. The Commission has had on a number of occasions found itself at differing viewpoints with the Federal Aviation Administration with reference to broadcast facilities adjacent to 108 MHz. The lower portion of the FM Band for those stations using IBOC could impact TV Channel 6 NTSC and DTV allocations and the upper band portion of the FM band could impact FAA facilities. With the attendant emissions as a necessary ingredient of the NRSC-5 standard in the adjacent channels, those portions of the rules specifically Section 73.525 and Section 73.622 should be subject to scrutiny to determine the potential of harmful interference to other licensees. Further, the impact to aeronautical band that begins as 108 MHz needs to be examined.

### Summary

The desire to provide an enhanced audio quality without the proper consideration of allocation issues could result in unintended consequences. These consequences could affect not only stations in the same service but other services. For example, the loss of daytime and nighttime secondary AM service needs to be examined, together with accumulated impact to those stations which are immediately adjacent to local channel stations. Potential complications can arise which could impact

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<sup>1</sup> "In the Matter of Changes in the Rules Relating to Non-Commercial Education FM Broadcast Stations Docket No. 20735, RM-1301, RM-1974, RM-2655" adopted October 26, 1984.

<sup>2</sup> "Compatibility Between the Broadcasting Services and VHF Aeronautical Mobile Radio Services," Proposed Rule Released April 12, 1985

NTSC Channel 6 service or alternatively impact DTV Channel 6.

Therefore, it is necessary if IBOC operation is to be authorized to provide for a rigorous and comprehensive methodology placed into the Rules, so that the actual predicted effect can be determined on each AM and FM station as well as those facilities located outside the FM band.

Further with the adoption of revised technical rules will permit appropriate international negotiations and understanding to be reached with neighboring administrations.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Donald G. Everist", is written over the typed name. The signature is stylized and cursive.

Donald G. Everist

Date: July 18, 2005



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**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C. 20554**

**In re:** )  
 )  
**Public Notice DA 05-1661** )  
**In-Band/On Channel Digital Radio** )  
**Broadcasting Standard NRSC-5** ) **MM Docket No. 99-325**

**TO: Secretary, Federal Communications Commission**

**COMMENTS**

I am an independent, medium market broadcaster from Beaumont, TX. My stations are located close enough to each other physically (20 miles) and on the spectrum (1340 and 1380 Mhz), that if I was mandated to use the ibiquity system I would interfere with myself.

In response to the FCC's call for input on allowing the ibiquity system of implementing In Band, On Channel (IBOC) Digital Stereo transmission and reception on the AM band:

1. The ibiquity system is flawed technically. If it receives FCC approval for full time broadcast, this action will further exacerbate the interference problems on the AM band. Ibiquity equipped stations are generating interference even from daytime only operation. KHNC, 1360 kHz in Colorado, had significant encroachment on their signal from an ibiquity equipped PBS station (20 kHz away on the AM band). Stories like theirs will quickly become epidemic if this flawed system is allowed the tacit endorsement of the FCC by its approval of full time operation of ibiquity systems. Ibiquity reduces coverage, imposes a delay, greatly increases co-channel and co-adjacent channel interference, and when it is fully implemented will result in an important medium being made un-listenable.
2. The FCC's endorsing this system by allowing it would make me wonder how objective the commission really is in fulfilling its mandate for action in the public interest.

3. The commission is considering what amounts to a gross breach of public trust in considering this action, since it will result in the further degrading of the AM band, the aural service most important as the medium of information and news for the majority of the public, at a time of crisis in our nation.
4. Ibiquity's system for achieving AM stereo is not truly "in-band", since its use would allow my neighbors to encroach on the bandwidth that has been assigned to existing broadcasters, even in daylight only use.
5. Changing the technical standards to allow this ibiquity system is tantamount to endorsing an inferior system. This action you are considering is made far worse, in that there is another system, far superior to ibiquity's, that operates well within the allotted spectrum for AM broadcasters, and has been demonstrated to extend the coverage of AM even broadcasting digital information, REDUCE off channel interference, and do so without requiring huge equipment purchases and licensing agreements. I know this from personal experience, since I have this Kahn CAMD system installed on my two stations now, running 24 hours a day, well within the NRSC limits currently allowed.

In my estimation, this is a sort of modern range war, with the FCC playing circuit judge. A huge combine is coming to town, and it is moving the fences of existing property owners, with the permission of the sheriff. The impact of this encroachment would be worsened by the FCC rubber stamping this action by saying "we will change the laws to allow fences to be moved, to make room for the combine's operation. We declare this is to be done in the name of an enhancement to ranching, (maybe they'd call it "digital" ranching in this metaphor, and certainly major moneyed interests would be enhanced by the change)".

In this "new west" the FCC is considering allowing, all the old cows would no longer be naturally edible. Ranchers would have to slaughter their existing stock and only raise the new cattle they would have to buy the rights to from the combine. The new cattle would be smaller, and much less robust. A

fee would be forced to be paid when every cow is born. And believe it or not, every person that might eat meat from these cows would have to buy their stoves and cooking utensils from the combine, to be able to consume the new product. So the combine bandits are making money coming and going, and shutting out all competition, with the help of the corrupt "local" law enforcement.

It is my most sincere hope that in the end, the FCC rides into town wearing the white hats we think of them wearing. They work to restore order, and improve ranching, without destroying the status quo, and provide even more product for the public to consume without disruption.

Respectfully submitted,

**VOICE IN THE WILDERNESS BROADCASTING, INC.**

By \_\_\_\_\_  
Ralph McBride  
President

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Regarding Public Notice # DA05-1661 regarding NRSC-5

July 18, 2005

The proposed NRSC-5 Standards submitted to the FCC will harm AM/FM broadcasting. Following are several points to consider.

A) The main objections is that it will cause co-channel interference on 1st and 2nd adjacencies. This will make many frequencies unable to have a clear signal.

Under present rules, we must broadcast on our assigned frequency. If we were to interfere with another frequency, like a spur, then we would be cited by the FCC.

Tests show that KSL AM 1160 in Salt Lake, is taking up parts of 1150 and 1170. This is not right.

B) When KSL AM 1160 came on stream with their system, it caused a 8 second delay in their Nauvoo Bell station ID at the top of the hour.

Plus, station personnel could no longer monitor the station for remote broadcast.

C) This NRSC-5 system does not allow broadcasts at night. It will create chaos with all signals.

D) The quality of the broadcast band is cut significantly. It will eliminate analog stereo.

E) Power line interference is increased, also underpass cut-outs are a problem.

In Summary, we have been using the CAM-D system that does not cause problems with any of the above-stated objections.

Holiday Broadcasting Company objects to this new proposed NRSC-5 standard.

Sincerely,

Ralph J. Carlson

President

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**Before The  
Federal Communications Division  
Washington, D.C. 20554**

In the Matter of:		
Digital Audio Broadcasting Systems		
And Their Impact on Existing Analog		MM Docket No. 99-325
Radio Broadcast Services		

To The Commission:

**REPLY COMMENTS ON  
National Radio Systems Committee's  
'IBOC Digital Radio Broadcasting Standard NRSC-5'**

The following reply comments are submitted in response to points made by various entities throughout the proceeding referenced in the caption above. Each point is roughly paraphrased in order to bring context to the comments thus presented below.

**\*\*\*\*This document replaces my earlier reply comment filing, dated Aug 8, 2005.  
That filing contains a prior version of the intended comment document. \*\*\*\***

- 1. In order for terrestrial radio to remain competitive, it must bring FM and AM media that are different and better than analog means and methods currently deliver.**

The very real decline in overall radio listening is not subject to debate. However the reasons for this decline are both relevant to the topic at hand; namely, digital radio broadcast, and clearly are subject to debate.

A significant percentage of the Industry comments presented in this proceeding, to date, all cite quality as the reason for radio being increasingly unable to compete in the media marketplace. However the reality is far different. Content is the most often cited public reason for failure to listen to the radio. Industry consolidation has brought with it a tight focus on specific demographics along with a more standardized programming model. Both of these things ignore vast numbers of potential listeners, formally better served in the more diverse radio environment of the past. The loss of these potential listeners cannot be ignored and cannot be explained by quality reasons alone, when the overall diversity of radio programming remains sharply reduced in recent times. The reality is quality has nothing to do with the issue, content and presentation do.<sup>1-5</sup>

The quality improvements IBOC digital radio broadcast bring to the table are fair for FM radio, but do not cause significant level of service changes to existing radio gear. This technology, when used on the AM broadcast band, delivers marginal quality improvements while at the same time also causing significant level of service degradation to existing radios in service today; thus, giving existing listeners another reason to tune out while at the same time asking them to purchase new radios that are increasingly likely to fail to deliver the content they are looking for in the first place.

Early Ibiqity Corporation press releases detailed the FM quality to be on par with Compact Disc and the AM quality to be on par with FM analog radio. Subsequent statements redefined these to be "Compact Disc like" and "FM radio like". The physical limitations of the RF spectrum and its information carrying capability limit the overall digital radio broadcast bit rates to those well below the industry accepted norms for CD quality audio delivery. Digital audio compression technology is improving however. We may see a time in the future where these low bit rates do actually deliver audio quality equal to the Compact Disc. The reality today is an audio stream, impressive given the limitations, that makes as many trade offs as existing analog technologies currently do.<sup>6</sup>

On the matter of radio quality in general, it is difficult, if not impossible to, out compete good enough in a cost practical way. Quality analog reproduction has been available to consumers, on both AM and FM, for many years. Advancements in technology combined with economies of scale have brought the cost of quality radios well within the reach of the average media consumer. For the last 10 years, the focus of radio receiver manufacturers has been on features, not overall sonic quality. The popularity of integrated radio units that combine radio with other media delivery technologies clearly supports the idea that content rules over quality where the average media consumer is concerned.

*In summary, what people hear on their radios is more important than the sonic quality is. Why then are we asking people to buy new high-quality radios when quality is not the primary issue?*

These things combined do not support the quality justification given for IBOC digital radio broadcast. One has to wonder if all the expensive IBOC digital radio broadcast implementation is worth the trouble given it does not properly address the core problem of declining radio listeners.

## **2. 'The window for change is narrow'**

The sheer amount of ongoing research and development happening as you read this clearly shows a technology not yet cooked. FM IBOC transmissions remain in a state of flux as 'multi-cast' broadcasts are being developed and refined, AM IBOC transmissions introduce significant noise and quality trade offs, and audio codec technology developments are incomplete as well.

Given the lack of demonstrable public demand for digital radio and the number of outstanding issues, I find it hard to justify a narrow window for technology change, particularly when the quality and cost expectations are being changed as well. If the radio industry is truly seeing a listener crisis, while failing to properly address content issues, said decline cannot be used as a solid justification for a rapid implementation of digital radio, simply because the two problems are not related.

There is a lot of potential revenue in new radio receiver sales and HD radio codec licensing. However these two things have little to do with the overall health of the radio industry as a whole when listeners are not receiving the content they are looking for. Consider this:

*If you had the choice of two radio stations, one that had the best possible quality, but poor programming and the other having marginal quality with outstanding programming, which station would you prefer to listen to?*

Most ordinary people would seek programming they can relate to, not the programming that sounds the best. Despite this rather obvious point, the radio industry is telling the commission better sound is the right solution. This makes no sense at all and does not justify the idea that we need to adopt digital radio now before it is too late. However, it does clearly suggest some focused effort on better addressing

the content needs of the listening radio public.

### **3. Learning from the mistake of AM Stereo**

Failure to properly choose and ratify a unified AM Stereo broadcast standard harmed the industry through general confusion. Broadcasters were not sure which system to use, receiver manufacturers were reluctant to support all systems, for cost and other reasons, all leaving the public largely unaware of the technology and its obvious benefits over traditional AM broadcasts.

Significantly, the various AM Stereo modulation methods all had various strengths and weaknesses. Rather than create a panel to objectively evaluate the various systems, the “free market” approach was used. NRSC-5, as proposed does not specify the audio codec to be used. In this way, IBOC is flawed in the same way that AM Stereo was. Future codec developments, alternative uses of the broadcast bit stream, and other variable elements are likely to fragment the digital radio landscape in the same way the various AM Stereo modulation techniques did. Software radios can help to mitigate this, but are we really going to ask radio consumers to treat their radios like they do their computers? Will digital radios meet the long service life expectations existing analog radios currently set? Does the listening public want to upgrade their radios, only to receive minor quality improvements? Do they need to? Will they be able to do these things, or will they experience frustration only to return to easy to use analog radio receivers?

These and other questions do not paint the picture necessary for the average consumer to believe HD radio will be any different than AM Stereo was.

Should the commission go forward with digital radio, despite the many valid questions and concerns surrounding the technology, mandated support for existing AM Stereo broadcasts in HD radio receivers would allow broadcasters currently using the technology to better leverage it while the AM IBOC issues continue to be worked out through ongoing research and development. Both FM analog mono and stereo broadcasts are supported, why not require the same for AM?

AM broadcasters, who either are unable to implement IBOC for technical or cost reasons can choose to broadcast AM Stereo broadcasts and still benefit from the new digital radio receivers. This benefit also would be felt by owners of existing quality AM Stereo radios and those for sale today.

AM IBOC broadcasts still have many technical issues that many comments here argue delay the implementation of digital radio as a whole. Support for improved AM broadcasts can be bolstered with AM Stereo, particularly during night time operations, with little to no significant impact on the overall digital radio system implementation as a whole.

### **4. Quickly approve AM IBOC for night time operation**

Essentially those entities making this plea are saying; “we know it isn't perfect, but we want it anyway.” Some AM stations have recently discontinued AM IBOC operation because of listener complaints.<sup>7</sup>

*“BCA writes: “The implications for AM service [when more stations switch to IBOC] are staggering. If the IBOC standard is not modified to eliminate the interference that it currently causes, the millions of listeners who depend upon AM..... will be*

*deprived of service."*

One of these stations reverted back to C-Quam AM Stereo rather than continue noisy and destructive IBOC broadcasts. If new HD radio receivers were able to also properly receive AM Stereo broadcasts, the industry would have solid solutions to problems like this one. Given the early state of digital radio and the small number of receivers sold to date, this change is easily incorporated into the digital radio rule making.

Why go forward with a system that we know will cause a lot of problems when solid alternatives are proven and in use today? (AM Stereo) It is my opinion, we should make the best use of the AM band and our existing radios while digital AM sees further study before implementation. The software nature of digital radios clearly allows for a more successful digital AM system to be deployed at such time as it is available for use.

**Respectfully Submitted,**

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**Dated: Aug, 8 2005**



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